

REMARKS

Objections to Specification

The Examiner objects to the specification on formal grounds because Applicant makes "reference to rows 4 and/or 5 of the periodic table of the elements, as such, [and] one would have to look up the periodic table to find which elements would fall within the scope of the claim." The Examiner suggests that Applicant recite the elements in the Specification and address any new matter issues.

Applicant has followed the Examiner's directions without agreeing with them. The relevant rows of the periodic table have now been recited as a group consisting of all the elements in the cited row or rows. In addition, a citation has been added to a Periodic Table appearing as an overleaf to the 11th Edition of the Merck Index (1989).

These amendments do not raise any new matter. The Periodic Table is well known to scientists and students in all walks of life and is set forth in hundreds if not thousands of textbooks and charts. The exemplar set forth in the overleaf of the 11th Edition of the Merck Index now cited in the application is simply one example.

Objections to Claims - Formal

The Examiner objects to claims 1-6, 10-23, 27-38, 39-43, 45-48, 50-53 because of the following informalities: "Claims are to be complete in themselves. See MPEP 2173.05(s). Applicant's claims make reference to rows 4 and/or 5 of the periodic table of the elements, as such, one would have to look up the periodic table to find which elements would fall within the scope of the claim." The Examiner suggests that Applicant set forth the elements both in the claims and the Specification and address any new matter issues.

Applicant has implemented these suggestions without agreeing with them. All references to the periodic table have now been canceled.

Objections to Claims – 35 USC § 112

The Examiner rejects various claims on a variety of grounds. Applicant responds as follows:

1. Claims 1-34 use the term "metal" to represent different types of metals. Examiner suggests that Applicant use "the metal of said metal chelate" instead of "said metal is a metal" or "said metal constituent". This suggestion has been implemented by Applicant, without agreeing with the suggestion, by using the terminology "the metal of said metal chelate" as a replacement for the prior terminology.
2. Claims 2, 19 recite the limitation "aqueous solution". The Examiner states that there is insufficient antecedent basis for this limitation in the claims and suggests that Applicant insert "aqueous solution" in claims 1, 18. Applicant has implemented this suggestion without agreeing with it.
3. Claims 10, 27, 39, 44, 49, 54 recite the limitation "chelate constituent". The Examiner believes that there is insufficient antecedent basis for this limitation in the claims and suggests using instead "the chelate of said metal chelate" instead. Applicant has implemented this suggestion without agreeing with it.
4. Claims 2, 3, 19, 20 recite the limitation "wherein said metal chelate is present in said aqueous solution in amount equal to from about ...pounds AI per acre." The Examiner believes that this limitation renders the claims indefinite as the limitation refers to application rate and does not appear to indicate how much is present in the aqueous solution. The Examiner further believes that the claims claim both a product and the method steps of using the product, which renders the claim indefinite. See MPEP 2173.05(p)(II).

Applicant has amended the claims in issue to meet these objections. It is standard in the agricultural industry to express component concentrations in terms of the amount of a component that will cover an acre at the desired concentration. Thus, if the objective is to apply 1 pound of copper to one acre, and to do so in 100 gallons of solution, the required concentration is 1 lb./100 gal. If the solution will be spread over 2 acres, the

required concentration is 2 lb./100 gal. The concentration is definite and readily calculable.

While Applicant does not agree with Examiner, claims 2, 3, 19, 20 have been amended to clarify this relationship. Each now recites the direct relationship between the desired chelate active ingredient ("AI") in terms of lbs./acre and the poundage of chelate AI actually applied to an acre by application of the chelate solution.

5. Claims 38, 43, 48, 53 recite the limitation "wherein said metal chelate is present in said aqueous solution in amount such that the metal is applied to the plants at a rate from about ...pound AI per acre." The Examiner believes that the claims are indefinite as they refer to application rate and do not appear to indicate how much is present in the aqueous solution.

Examiner suggests that Applicant use "wherein said metal chelate is applied to the plants at a rate of from about ... pounds AI per acre". Applicant has implemented this suggestion without agreeing with the Examiner.

6. Claims 11 and 28 recite $(\text{NH}_3)_2\text{HPO}_3$, $(\text{NH}_3)_2\text{HPO}_4$ and $(\text{NH}_3)_3\text{PO}_4$. The Examiner believes that this renders the claims indefinite as there is insufficient antecedent basis for the limitation in the claims and the compounds do not fall within the scope of the formulas in claims 1 and 18.

This objection has been met by adding the recited compositions to claims 1 and 18 without agreeing with the Examiner. This resolves any antecedent problem noted by the Examiner.

7. Claims 1, 3, 6-9, 11-14 are rejected as being incomplete for omitting essential elements, namely, aqueous solution. See MPEP § 2172.01. The Examiner believes that the specification appears to indicate that the composition needs to be in an aqueous solution (specification, Pg. 14).

This objection has been resolved, without agreeing with the Examiner, by amending the preamble of claim 1 to recite an "aqueous solution." Applicant submits that the other specified claims do not need to be amended in that each of them depend from claim 1.

Rejections of Claims - 35 USC § 103

The Examiner has rejected claims 1-54 under 35 U.S.C. 103(a) as being unpatentable over Horriere et al. in view of in view of Ducret et al. (U.S. Pat. 4,139,616), Fenn et al. (1984), Reuveni et al. (Plant Pathology 1995), Scher (U.S. Pat. 4,714,614) and Supa Crop (1990). The Examiner concedes that there are differences between the prior art and the claimed inventions, namely, that the prior art does teach the combination of an EDDHA metal chelate, phosphonate and phosphate. However, the Examiner finds this combination in the prior art on the ground that it supposedly is known in the art to combine phosphates, phosphates and metal chelates and concludes that it would have been well within the motivation and skill of one of ordinary skill in the art to make the combination with the expectation that it would exhibit increased effectiveness.

Applicant respectfully disagrees with the Examiner on each of these points. None of the prior art teaches or suggests the combination set forth in the claims. Indeed, some of the references actually teach away from the claimed combination. Nonetheless, in the spirit of placing the claims in form for allowance, Applicant has clarified the chelate-related portion of each independent claim by specifying particular chelate metals and particular chelates of the EDDHA class (pEDDHA, EDDHA, and EDDHMA). As discussed below, this is plainly not required by the prior art.

Horriere discloses fungicidal compositions for treating fungal infections, mildew in particular. The compositions are based on monoesters of phosphorus acid in combination with one of three types of contact fungicide, none of which is a phosphate or a chelate: (1) copper-based compositions such as copper oxychloride, copper sulphate and cuprous oxide, (2) manganese-based compositions such as manganese ethylene bisdithiocarbamate and manganese-zinc ethylene bisdithiocarbamate and (3) phthalimide type fungicides. There is no teaching or suggestion anywhere in Horriere to add either a phosphate or a metal chelate to the disclosed fungicidal compositions. Indeed, Horriere taught away from metal chelates by using other types of metal-based fungicide components.

Ducret discloses fungicidal compositions for treating fungal infections, mildew in

particular. The compositions are based on monoesters of phosphorus acid. There is no teaching or suggestion anywhere in Ducret to add either a phosphate or a metal chelate to the disclosed fungicidal compositions. The only place metal is mentioned is as a possible subsistent of the disclosed fungicidal compositions. No metal chelate is disclosed.

Fenn discloses experimental use of fosetyl-Al (aluminum tris-O-ethyl phosphonate) and phosphorus acid to treat several species of Phytophthora in vitro. Phosphate was present in the growth media, not in the applied treatments. Fenn found that the phosphate level reduced the inhibition of mycelial growth due to fosetyl-Al, but had little or no effect on the inhibition caused by phosphorus acid. There was no teaching or suggestion anywhere in Fenn to combine a phosphonate composition with a phosphate composition to treat Phytophthora. Indeed, Fenn used both compositions in his experiments, but failed to appreciate not only the benefits of using them in combination to treat Phytophthora, but further to use them in combination with metal chelates, which Fenn does not even mention.

Reuveni discloses a treatment for powdery mildew consisting of an aqueous solution of phosphates and potassium salts. Reuveni does not teach or suggest a mixture of a phosphate with a phosphonate, much less a metal chelate. To the contrary, Ruveni teaches away from that combination by praising the benefits of a mixture of a phosphate with a potassium salt rather than a phosphonate or metal chelate.

Sher discloses compositions for combating soil-borne Fusarium oxysporum. It discloses soil-inserted mixtures of a disease-suppressant strain of *Pseudomonas putida*, ferric iron chelating agents and the corresponding chelates of those agents. Sher does not teach a combination of either a phosphonate, a phosphate, or a combination of either with an iron chelate. To the contrary, Sher teaches away from that combination by praising the benefits of a mixture of an iron chelate with a disease-suppressant strain of *Pseudomonas putida* rather than with a phosphonate, a phosphate or both.

Supa Crop discloses a "protective pop-up starter" for both protecting and feeding emerging plants. The Supa Phos literature identifies phosphorus acid as the "insurance against soil borne pathogens" and characterizes the remainder of the starter as "a starter

fertilizer containing a complete set of all major and minor elements required by plants." The latter components appear to include diammonium phosphate, as well as several EDTA-based metal chelates, which are said to be present to provide "trace elements." In short, Supa Crop teaches a fungicide based on phosphorus acid. It neither teaches or suggests that the addition of a phosphate, a chelate, or both will improve its "protective" properties.

Thus, the prior art breaks down as follows:

Horriere	-	phosphate + non-chelate metals
Ducret	-	phosphate only
Fenn	-	phosphonate only
Reuveni	-	phosphate + potassium salt
Sher	-	chelate + <i>Pseudomonas putida</i>
Supa Crop	-	phosphonate + phosphate/EDTA chelate fertilizer

There is no consistent thread here. This prior art takes a variety of approaches, none of which teach or suggest the combination of the claims in issue. If anything, this art would lead one of ordinary skill in the art away from the subject matter of the claims in issue.

The three-part compositions of the claims are not obvious. As combined, they display unexpectedly superior properties relative to compositions based on chelates alone and phosphonate/phosphonate combinations alone. This classic case of synergism fully rebuts the Examiner's unsound case of obviousness.

A demonstration of this synergism occurred in recent trials in Florida. These are discussed in detail in the Declaration of Dr. John B. Taylor. The work involved a cooperative test to evaluate the CuEDDHA/PO₃/PO₄ combination in the control of *Xanthomonas campestris* pv *campestris* in the systemic phase, which is difficult to control. This disease is the well-known "Black Rot" of crucifers (cabbage, cauliflower, etc.) and is one of the most difficult bacterial pathogens to manage in the production of these crops.

Three experimental solutions were prepared:

- FNX-100, a solution of PO3/PO4 @ 2% v/v.
- FNX-200, a solution of CuEDDHA @ 0.2 lb. Cu AI/100 gal.
- FNX-2000, a solution of FNX-100 @ 2% + FNX-200 0.21bs AI Cu.

These were sprayed on cauliflower plants before they were inoculated with *Xanthomonas campestris* pv *campestris*. In part, the results for percent of plants with systemic infections were as follows:

- FNX-100 - 21.0%.
- FNX-200 - 34.7%.
- FNX-2000 - 1.39%.

Nothing in the prior art teaches or suggests this synergistic result.

Rejections of Claims - Obviousness-Type Double Patenting

The Examiner's analysis of double patenting tracks his analysis of the § 103 issue, with the difference that the Examiner uses Applicant's prior patents as prior art. As the Examiner notes, that prior art teaches a fungicide comprising a phosphate and phosphonate, but not a chelate. The question, thus, is whether the prior art teaches or suggests the addition of a chelate. As discussed, it does not.

Two of the Examiner's references relate to chelates: Sher and Supa Crop. Sher teaches a combination of a ferric iron chelate with *Pseudomonas putida*, which is not remotely similar to a phosphate or phosphonate. Supa Crop teaches use of chelates as a vehicle for conveying trace amounts of metals to plants for nutritional purposes, and it appears to employ a phosphate for the same purpose. There is nothing in Supa Crop that would motivate one of ordinary skill in the art to make the 3-component composition now claimed by Applicant.

Beyond this, and as discussed above, the claimed three-part compositions exhibit synergy. Nothing in the prior art teaches or suggests this result. This is determinative on the issue of obviousness, whether in the § 103 context or the double-patenting context.

PATENT
Attorney Docket No.: 396421
Express Mail Label No.: EV 210654087 US

Applicant has -- nonetheless and as discussed -- modified its claims in the interest of
putting the claims in condition for allowance.

PATENT
Attorney Docket No.: 396421
Express Mail Label No.: EV 210654087 US

CONCLUSION

Applicant has addressed the Examiners concerns relating to the specifications and claims. In particular, Applicant has amended one paragraph of the specification and amended or cancelled application claims 1, 2, 3, 4, 5, 6, 7, 8, 9 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 30, 32, 33, 35, 38, 39, 40, 43, 44, 45, 48, 49, 50, 53 and 54 in response to the Examiner's concerns about informality, indefiniteness under 35 USC §§ 112 and obviousness. While Applicant does not believe that subject matter of its claims is obvious, and despite its showing of synergism, Applicant has amended each of its independent claims to met the Examiner's concerns about obviousness under § 103 and in the double-patenting context.

Applicant respectfully submits that the claims are in conditions for allows and respectfully solicits that result. Applicant believes that no fees are due. However, if fees are in fact deemed necessary in connection with this Amendment, the Examiner is authorized to charge deposit account number 12-0600. Please call the undersigned with any questions.

Respectfully submitted



Peter C. Knops, Reg. No. 37,659
Lathrop & Gage, L.C.
2345 Grand Boulevard, Suite 2400
Kansas City, Missouri 64108
Telephone: (816) 460-5826
Facsimile: (816) 292-2001